

Orbiter

The Official Newsletter of the Aerospace Medicine
Student and Resident Organization



HEADING TO ANCHORAGE, ALASKA

Dear AMSRO members,

Welcome back to another issue of *The Orbiter*. This issue comes just in time for the 2011 AsMA meeting in Anchorage, Alaska. For those attending, send me your thoughts, experiences and highlights of the 82nd AsMA meeting. If you also have any other experiences you would like to share from conferences, internships you have participated in, your current research, or any news of members, send your articles my way. All of this may be sent to: laura.drudi@mail.mcgill.ca. Enjoy the issue and I look forward to your feedback and your articles!

Laura Marie Drudi

A UNIQUE JOURNEY

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When I asked people who had been through the astronaut selection process what one needed to do to become an astronaut, there was always one consistent answer: Do something that you love because your chances of being selected are slim. I've heard many people besides myself ask that question in high school, college, and beyond. When I started college as an aerospace engineering major who dreamed of going to space one day, I had to decide how these words would affect my career path. Many people I knew heard that answer and decided that perhaps it is not worth trying - too much competition, too long of an educational pathway. A few people I knew took that answer as an opportunity to create the type of career that they would find exciting regardless of whether or not they ever got selected. I have attempted to do the same.

I spent my undergraduate and graduate years in engineering studying electric propulsion for spacecraft at the Air Force Research Laboratory at Edwards Air Force Base. In my time there I built prototype rockets called Pulsed Plasma Thrusters and tested them, played with lasers, and occasionally blew things up. It was a rewarding job and carried me through my Ph.D. in engineering. However, I noticed that the career arc I was starting to form would take me into the world of military or commercial satellites, which while interesting and fun, had never inspired me in the way human spaceflight had. Therefore I reasoned that if I also went to medical school and became a doctor I would have a better chance of being able to work with the human spaceflight program. I applied to the MD/PhD program at the University of Illinois where I was already doing graduate work and they accepted me. After four years of undergraduate engineering and seven years of graduate school I finally started medical school.

I had concerns about building up so much debt so I also worked as a post-doc in a nuclear engineering laboratory during the first couple years of medical school. It allowed me to keep my hands in some interesting research as well as minimize my debt. It also nearly sucked the life out of me, and by third year of medical school I decided I had to stop splitting my time and focus on the medical side of my career. This was not easy - I had put a good

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deal of time and effort into reaching the level that I had as an engineer and now I was starting all over again at the bottom of the medical ladder. However, it did present some very fun opportunities. Between my third and fourth years of medical school I spent a year living in Zambia in Africa working on HIV research for an NIH Fogarty fellowship. I reasoned that working in a resource-limited setting and learning clinical research skills was definitely applicable to my long-term goals. Plus I got to go on a safari and travel across Africa.

In the summer of my fourth year of medical school I decided to start looking once again at how I could direct my career back towards human spaceflight and I did the Aerospace Medicine Short Course at UTMB Galveston. While there I met amazing people and rediscovered that sense of inspiration I had when I was younger. There were lectures from people who had worked in this field for years and their stories were priceless to a space nerd like me. My class met astronauts and had a talk from the flight surgeon for the Apollo missions; we toured NASA facilities and did both a hyperbaric dive and an altitude chamber flight at 25,000 ft. We learned about the changes in physiology that occur during spaceflight and got to touch and try on space suits. This was the type of thing that reminded my why I had spent so much time working and studying – to be able to contribute in some way to the endeavor of human spaceflight.



Erik trying on a spacesuit at the Aerospace Medicine Short Course at UTMB

When I was done with the course I had to decide on a residency. There is an option to do a combined aerospace medicine/internal medicine residency that takes 4 years or another option to apply to do a 2-year aerospace medicine residency if you've already done a residency in another area. I looked hard at the combined residency and even interviewed, but I decided that I really wanted to do an emergency medicine residency first and then apply to do the aerospace medicine residency afterwards. I am now finishing my second year of the emergency medicine residency at Brigham and Women's Hospital/Massachusetts General Hospital in Boston.

At each step along this path I faced certain challenges, mostly from people who were perplexed by what I am trying to do. There are many people who tried to talk me out of doing so many different things, pointing out that I would be too spread out to get a good job or people would not take me seriously for various career paths. My experiences applying to medical school and then residency have convinced me otherwise – most programs seemed intrigued by my attempt to generate a skill set that would hopefully apply to aerospace medicine and the human spaceflight program. I have found a broadly supportive atmosphere within my residency program for my interests even though they are not typical of emergency medicine residents.

In two more years I will finish my emergency medicine residency and will have to decide on the next step in my career path. I am again looking hard at the aerospace medicine residency as an opportunity to work on the human spaceflight program. The changes in funding and mission structure at NASA are concerning and I wonder about what opportunities will remain when I'm done with my training. However, the continuing commitment to the International Space Station and the successes of the burgeoning private spaceflight industry keep me hopeful that there will be exciting jobs available in these areas.

As I look back on the advice given to me so many years ago when I first inquired about how to become an astronaut, I'm happy to say that viewing it as an opportunity to structure a fun career has allowed me to have some fantastic experiences. Along the way I've enjoyed the engineering research, the international work, and the emergency medicine training I've undertaken. I recognize that the chances of being selected as an astronaut are very slim, but I will continue to make the attempt. After all, having that as a goal has led me to a lot of fun experiences. In a couple years I'll be able to apply to the aerospace medicine residency and hopefully rediscover again the inspiration that human spaceflight provides.



STS-133 LAUNCH – DISCOVERY'S FINAL FLIGHT

By Natacha Chough, MD

Emergency Medicine Resident-Stanford University

Over the past couple of years, I've been lucky to be present at some shuttle launches by virtue of the fact that I was either rotating through the JSC or KSC aerospace medicine clerkships at the time. I have also been fortunate to see both day and night launches (STS-129, STS-131), and to watch them from various areas on-site at KSC (Banana River/Saturn V building site, and crawlerway roadblock with KSC Medical Triage crew, respectively).

STS-133, however, was particularly significant for me, and to the space medicine community, for two reasons: first, it was, of course, the last flight of Discovery, the most traveled orbiter in the fleet, and marked the beginning of the end for the entire shuttle program. Second, the crew included Mike Barratt, M.D., AsMA member and former NASA flight surgeon. Barratt also happens to be from both my hometown and college alma mater, and therefore somewhat of an informal mentor to me since meeting him after his Expedition 19/20 increment while I was at JSC in 2009. I was touched to have been invited to his launch.



While the anticipation of any shuttle launch comes with palpable excitement, what was different for me this time was an underlying sense of anxiety and concern for the safety of a crewmember I personally knew. As an aspiring flight surgeon, this new dimension to the launch experience was particularly poignant in better understanding, in part, the emotions of the crewmembers' family and friends on launch day.

The media site was my camp for this launch, and I occupied myself with watching and listening to NASA TV feeds, watching the astrovan drive past us to the pad, pacing back and forth near the countdown clock, and feeling inwardly both relieved and increasingly nervous as each major step on countdown checklists went as planned. Around T-5, I moved towards the water's edge that faced the turn basin for some personal space. This was around the time that a hold was placed due to RSO earlier reporting a "NO GO," and I was out of earshot from any clear loudspeaker regarding launch status. Not long after, however, cheers from the media site bleachers gave me my answer: Discovery was "GO" for her final flight.

A shuttle launch is an experience for multiple senses, and Discovery's last was no exception. There was a plume of smoke from the SSMEs igniting, followed by SRB ignition 6 seconds later, and she leapt off the pad. I held my breath. The intense brightness of the SRBs assaulted my retinas, even on that sunny day. But what came next is often the only thing that makes me know I'm truly present and not watching a launch on TV: the palpable crackling and sound reverberations created by the SRBs. With the water directly in front of me this time, the sound seemed to arrive faster and louder than usual; it is often emotionally moving. With this being the final, historic flight of a vehicle I have followed since childhood, and that had a friend and role model on board, more than a few tears were shed. It wasn't until SRB separation that we all began to breathe normally again.

I of course followed all the days of the mission, sneaking in updates between hospital rounds and streaming NASA TV at all hours of the night when at home. Imagine my surprise when, on flight day 11, which happened to be my birthday, I receive a call from Mike Barratt on orbit! It was quite a special treat to hear from him on a fully assembled station and near the completion of an epic mission, with all the hard work accomplished.

With Discovery now safely back on Earth and being readied for her final destination to the Udvar-Hazy branch of the Smithsonian, one cannot help but feel a bittersweet sense of closure on this most traveled orbiter. She served us well; may the next vehicle to follow in her footsteps continue what she started, and help us understand more about ourselves and where we are heading.



EXPLORING THE CORAL OF COZUMEL

*By Gregory Stewart, MD
Rural Family Medicine Resident
University of Western Ontario*



After joining the Cousteau Divers Network www.cousteaudivers.org earlier this year, I was determined to learn more about protected marine ecosystems around the world. Cozumel was an obvious choice to visit due to its vast array of marine life ranging from numerous corals, invertebrates, fish, turtles, eels, rays and sharks. Not to mention fabulous water clarity and tremendous visibility.

I was not disappointed after scuba diving the Santa Rosa wall, a short boat ride from shore. An experience that I vividly remember was the overwhelming size of the coral wall. Due to the tremendous visibility at the dive site, I found it very challenging to maintain a constant depth. I quickly realized that the immense scale of the reef was creating an optical illusion for my senses. As an active pilot I realized it was time to ignore the misleading information my body was providing and rely on my instruments. With a steady eye on my depth gauge, I quickly corrected my depth and maintained a safe dive profile to avoid unnecessary risk of decompression sickness. Furthermore, I learned that outstanding visibility could make for a very challenging and rewarding underwater experience.

In addition to exploration, the Cousteau Divers Network is an organization that has a mandate to protect the marine environments of our planet through documentation of marine organisms. Thus, through objective measurements taken by

members of the diving society, each and every dive can contribute to the ongoing effort to preserve the biodiversity of marine environments around the world. In the words of Cousteau himself, "People protect what they love."

In 1961, Jacques Cousteau visited the small Caribbean island of Cozumel and discovered one of the best scuba diving locations in the world. The same year, President Kennedy awarded the National Geographic Society's Special Gold Medal to Jacques Cousteau. President Kennedy said, "We have learned in the last sixty years how to fly better than the birds – or at least higher and longer. And the Captain has given us a possibility that some day we may swim as well as the fish – or at least deeper. And he is, therefore, one of the great explorers of an entirely new dimension, and I can imagine his satisfaction in having opened up the ocean floor to man and to science." To celebrate the fiftieth anniversary of Cousteau's famous adventure, it was a great privilege to follow in the fin-strides of one of the greatest explorers of our "water planet".



FOCUS ON CURRENT/PAST MEMBERS

MARLENE GRENON, MDCM MSc FRCSC



Marlene was born in Quebec, Canada. She obtained a diploma in space sciences from the International Space University (ISU) in 1998. She graduated from McGill Medical School and obtained a Masters' degree from the Scholars in Clinical Science Program of Harvard Medical School. She then completed training in cardiac surgery at McGill University, vascular surgery at the University of British Columbia and endovascular surgery at the Arizona Heart Institute.

Her published work in cardiovascular physiology and aerospace medicine continues to have an important impact on the cardiovascular health of astronauts. Using new methods developed at MIT where she completed a research fellowship, her team demonstrated an increased risk for cardiac dysrhythmias during simulations of microgravity and has evaluated potential countermeasures for cardiovascular deconditioning. The research she has been involved in will facilitate safer space travel and lead to new developments that can eventually benefit terrestrial medicine.

Having reached the very final stages as one of the five remaining women of the Canadian Astronaut Selection in 2009, Marlene decided to postpone her astronaut calling in order to continue her dual surgery and space medicine research tracks. She has joined the Hughes-Fulford Lab and will start shortly her clinical duties at the VA and UCSF as an Assistant Professor in the Department of Surgery.

THE 10TH ANNUAL SPACE GENERATION CONGRESS BRINGS TO CAPE TOWN, SOUTH AFRICA THE HEADS OF ROCOSMOS, THE IAF AND UN COPUOS

*By Oana Sandu, MSc
PR for SGAC*

The Space Generation Advisory Council in Support of the United Nations Program on Space Applications (SGAC) announced its 10th Space Generation Congress (SGC) in Cape Town, South Africa. Held annually in conjunction with the International Astronautical Congress, SGC is the only global space conference of its kind for university students and young professionals interested in today's key space issues and is limited only to 100 selected delegates.

Delegates at the Space Generation Congress analyze today's top international space topics, listen to speeches from the leaders of today's global space sector, and build their network while meeting other delegates — tomorrow's global space sector leaders. Among the 2011 confirmed Congress speakers are (in alphabetical order):

- Berndt Feuerbacher, the President of the International Astronautical Federation (IAF)
- Anatoly Perminov, the Head of the Russian Federal Space Agency (ROSCOSMOS)
- Dumitru Prunariu, the Chairman of UN Committee on the Peaceful Uses of Outer Space (UN COPUOS)

Conclusions and recommendations from the international university students and young professionals are compiled and shared throughout the following year at the United Nations, at conferences, and with SGAC's network, alumni, and partners.

To find out more information about the congress and how you can get involved or participate please visit:
www.spacegenerationcongress.org.



MESSAGE FROM OUR WEBMASTER-BECOMING THE PRAYER

*By Joseph Eleid
Medical Student, University Arizona*

Hi AMSROers! I've been an AMSRO member and your webmaster for almost a year now, and what a year it's been! The following is something I prepared for the Willd Body Ceremony that was held at UofA COM last Fall, where I am currently finishing up my second year. It was inspired by my first year of medical school, and written for the families of the brave souls who donated their remains for us to study. I hope you enjoy it! Be well. – Joe

The study of medicine, the nature of which has been experienced only by those who we look at and say "Doctor", is an experience full of changes. Even after one year of study, we have changed our lifestyles, our habits, our studying methods, or the people whom we choose to spend time with; some have changed their political views, and even a few have changed their spiritual beliefs. With such a great wealth of information at our fingertips, it is hard not to change something. Thoughts like this crossed my mind when I entered the anatomy lab for the first time. What will change about me after I do what I'm about to do in here? How desensitized will I have become after this is over? I wonder what everyone else is thinking... And so on. Soon after beginning our studies in the anatomy lab, we were very used to the procedures and the activities as we moved through each body system. It was surprisingly easy for me – easy to do the work. What I didn't expect were my feelings towards the end.

I noticed in the second semester that I began to get uneasy at times. Something was beginning to bother me. It was as if I thought the willd bodies had enough of our working on them – "Haven't they had enough of us?" Details, and more details...study, and more study... It soon felt like a crime to even be in there, doing any of that. This feeling did not make sense to me, since I had already made the commitment to do this work, and I had no hesitation before – why did it bother me now? It was around this time that I noticed something that one of my group mates did. It stood out to me more now, and apparently she had been doing this all along – she said "thank you" to our willd body every time we were finished with a lab. I remembered that some classmates of mine even said prayers over their willd bodies before working. I then remembered why I was there.

At the beginning of the year, someone said to me that we all gave up something to be here – here in medical school. What did these people give to be here, to leave us their remains, so we could study? There are many ways to show thanks, and there are many ways to pray – but there is no greater way than to BE the prayer, moving to EARN what has already been given to us. Every willd body is a prayer. Their gift is our education. I can say thank you, but I know that is not enough. Clearly, I have a lot of work to do; we have already set to work, moving to make this a valid exchange. We will earn this.

UPCOMING OPPORTUNITIES

INTERNATIONAL SPACE UNIVERSITY (ISU)

ISU will be hosting its 2011 Summer Studies Program in Graz, Austria. A variety of scholarships are available through the Canadian Federation of ISU, as well as the National Space Society. The 2012 Summer Studies Program will convene at Florida's Space Coast, and the 2013 Summer Studies Program will be taking place in Brazil.

2011 INTERNATIONAL ASTRONAUTICAL CONGRESS

All eyes will be on Cape Town, South Africa for the annual meeting of the International Astronautical Congress (IAC). Students and young professionals can be sponsored through their national space agency through International Space Education Board (ISEB). NASA, CSA, ESA, and JAXA offer a variety of scholarships; as well there are youth grants that are given on a competitive basis through the International Astronautical Federation committee.